

A New Genus with Two New Species of Hygrophilous Trechine Beetles (Coleoptera, Trechinae) from the Daba Shan Mountains, West-central China

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Abstract A new genus is erected for two hygrophilous trechine beetles belonging to the *Agonotrechus* series from the Daba Shan Mountains in West-central China. It is related to *Deuveotrechus* S. UÉNO from northwestern Yunnan, but is readily distinguished by mandibular, labial and chaetotaxial peculiarities. The new names given are *Dabatrechus* for the genus, *D. eccentricus* for the western species, and *D. hygrophilus* for the eastern species. The two new species are closely similar in general appearance, but are incredibly different from each other in conformation of the male genitalia.

Early in the summer of this year, I had an opportunity to make an investigation of the coleopteran fauna of the Daba Shan Mountains that stretch from west to east on the borders of Shaanxi and Sichuan Provinces and extend eastwards into the westernmost part of Hubei on the northern side of the Yangzi Jiang River. Collaborated with Masataka SATÔ, I visited various places including thirteen limestone caves on either side of the mountain range, and collected a fair number of trechine beetles, among which were found two specimens apparently belonging to the *Agonotrechus* series. They look like *Deuveotrechus yinae* from western Yunnan in particular, but are evidently different from it in some critical points. One of them was found near the westernmost part of the mountain range, and the other at the easternmost part about 430 km apart from the collecting site of the former.

Though similar to each other at first sight, the two specimens are different in many details of external morphology, and besides, incredibly differ in conformation of the male genitalia. The genitalic difference almost attains to the level that could be considered as that of generic importance. At the present moment, however, I prefer to regard them as belonging to the same genus in view of the close similarity in diagnostic features of external morphology, and am going to erect for them a new genus to be called *Dabatrechus*. Similar discrepancy between external and genitalic peculiarities is also known in the genus *Deuveotrechus* S. UÉNO (1995, p. 99, and also 1996) and the genus *Luzonotrechus* S. UÉNO (1979, p. 26, and also 1987), and can be regarded as a unique diversification exhibited by the members of the *Agonotrechus* series and its derivatives.

These interesting new trechines will be described in the present paper under the names *Dabatrechus eccentricus* and *D. hygrophilus*, the former from Mt. Guangwu Shan lying at the Sichuan side of the westernmost part of the Daba Shan Mountains and the latter from the Yidao Xia Valley at the easternmost part of the same mountains in western Hubei. The abbreviations used herein are the same as those explained in previous papers of mine.

Before going into further details, I wish to express my heartfelt thanks to Dr. Masataka SATÔ for his collaboration in the field, and to Mr. FAN Ting of the Academia Sinica for his unfailing help to our investigations.

Genus *Dabatrechus* S. UENO, nov.

Type species: *Dabatrechus eccentricus* S. UENO, sp. nov.

Belonging to the *Agonotrechus* series and related to *Deuveotrechus* S. UENO from northwestern Yunnan, but different from it in the bidentate right mandible, fused labium, and the absence of supernumerary dorsal pores on the third elytral stria.

Medium-sized trechines with relatively short broad body either constricted between prothorax and hind body (*D. hygrophilus*) or not; dorsal surface glabrous and polished, venter either glabrous (*D. eccentricus*) or provided with several short hairs on the median part of each sternite (*D. hygrophilus*); microsculpture either completely absent (*D. hygrophilus*) or present only in marginal areas of pronotum as fine transverse lines (*D. eccentricus*); colour dark brown with paler palpi and legs; inner wings atrophied.

Head transverse, with deep entire frontal furrows strongly arcuate or even subangulate at middle and widely divergent in front and behind; two pair of supraorbital pores present on lines subparallel to each other or slightly divergent posteriad, the anterior pair foveolate and lying near to the posterior pair; eyes fairly large and convex together with genae, either clearly faceted (*D. eccentricus*) or not, genae either glabrous (*D. hygrophilus*) or with a few vestigial hairs (*D. eccentricus*); labrum transverse and dilated anteriad, with the apical margin deeply and evenly emarginate. Mandibles stout though acute at the incurved apical portions, right mandible bidentate, devoid of premolar tooth. Labium fused though vestige of labial suture is recognizable; mentum longitudinally depressed on each side, mental tooth broad, either truncated or rounded at the tip; submentum sexsetose; ligula porrect at the middle, octosetose as usual; paraglossae thin and arcuate, extending much beyond ligula; labial palpus fairly slender, penultimate palpomere gradually dilated towards apex and quadrisetose, apical palpomere slightly longer than the penultimate. Maxillae short, stout and arcuate, lacinia with several stout spines and hairs on the inner margin; maxillary palpus with short penultimate palpomere which is widely dilated towards apex and bears vestiges of a few minute hairs, apical palpomere elongated subconical, about 1.3 times as long as the penultimate. Antennae subfiliform, not reaching the middle of elytra.

Pronotum subcordate and convex, either gradually narrowed posteriad (*D. eccen-*

tricus) or rather strongly contracted at the base (*D. hygrophilus*), which is either briefly or vestigially subpedunculate; sides completely bordered, more or less strongly rounded in front, either straight (*D. eccentricus*) or briefly sinuate just before hind angles (*D. hygrophilus*), with two pair of marginal setae, of which the anterior pair is inserted at about or a little before the widest part and the posterior one almost on hind angles; front angles completely rounded off, hind angles either obtuse (*D. eccentricus*) or subrectangular (*D. hygrophilus*); no postangular carinae. Scutellum small.

Elytra ovate, evidently wider than fore body, with distinct but rounded shoulders; dorsum convex; sides bordered, prehumeral border either complete to basal peduncle (*D. eccentricus*) or diminishing antero-internally though reaching the site of the base of stria 5; striae vanished with the exception of inner two or three and apical half of 8, the former of which (at least the sutural one) are coarsely punctate or crenulate on the disc; scutellar striole distinct, apical striole also distinct though short and free at the anterior end; one or two setiferous dorsal pores present on or on the site of stria 3, none on stria 5; preapical pore either present (*D. eccentricus*) or absent (*D. hygrophilus*); two apical pores present as usual; marginal umbilicate pores regular, four pores of the humeral set ranged almost equidistantly.

Ventral surface smooth, either glabrous or bearing several short hairs on each sternite between a pair of paramedian setae; anal sternite bisetose in ♂. Legs of moderate length; protibiae pubescent though rather minutely on the anterior face, either simple (*D. hygrophilus*) or vestigially grooved on the external face (*D. eccentricus*); tarsi thin; in ♂, two proximal tarsomeres of each protarsus more or less dilated, inwardly produced or denticulate at apices, and furnished beneath with adhesive appendages.

Male genitalia surprisingly variable in conformation according to species. Aedeagus gutter-like, widely membraneous on dorsum from base to apical lobe, with the basal part open on both dorsal and ventral sides, sometimes forming a kind of ring, though the basal extremity is completely closed and bears a sagittal aileron; apical lobe either very short (*D. eccentricus*) or long and narrow (*D. hygrophilus*); inner sac scaly at the apical part and bearing one (*D. hygrophilus*) or two (*D. eccentricus*) copulatory pieces, spoon-like and hyaline in the former, palp-like and heavily sclerotized in the latter. Styles narrow at the apical parts, left style obviously longer than the right and bearing reduced ventral apophysis, each provided with four, relatively short setae at the apex.

Range. Known so far only from the Daba Shan Mountains in West-central China.

Notes. Though similar in many respects to *Deuveotrechus*, this new genus may not be directly related to it in view of the radical difference in some fundamental features, and the overall similarity between the two genera may have been brought about through parallel evolution. On the other hand, similar unusual divergence of genitalic conformation is also known in *Deuveotrechus*. In describing *Deuveotrechus yinae* (UÉNO, 1996, p. 14, figs. 1–3) from the Diancang Shan Mountains in western Yunnan, I noticed that the male genitalia of the new species were strikingly different from those

of the type species, *D. yuae* (DEUVE, 1992, p. 171, figs. 1, 12; UÉNO, 1995, p. 100, figs. 4–5), and that the peculiar modification of male genitalia shown by *D. yinae* was to some extent similar to that shown by the *bontoc* group of the genus *Luzonotrechus*, which might have a remote relationship to the genera of the *Agonotrechus* series. The discovery of *Dabatrechus* seems to give another example of unusual diversification, suggesting that the genitalic divergence may not be exceptional in the *Agonotrechus* series.

As will be described under the headings of the new species, the known members of *Dabatrechus* are unusually hygrophilous and are found in coexistence with bembidiines. This is quite exceptional for the apterous members of the *Agonotrechus* series, most of which are either humicolous, muscicolous or saproxylophilous.

Dabatrechus eccentricus S. UÉNO, sp. nov.

(Figs. 1–3)

Length: 4.10 mm (from apical margin of clypeus to apices of elytra).

Body short and broad, glabrous and polished on both dorsum and venter; microsculpture mostly vanished but perceptible as fine transverse lines in marginal areas of pronotum and in small fragmentary portions along frontal furrows. Colour dark brown, shiny, lighter in basal halves of elytral disc, which is weakly iridescent; palpi and legs light yellowish brown.

Head wide, depressed above, with deep frontal furrows which are not angulate at middle and more widely divergent posteriad than antieriad; supraorbital areas gently convex, with two pair of supraorbital pores on lines subparallel to each other and closely located one after the other, the anterior pair being located slightly behind the mid-eye level; eyes moderately convex and distinctly faceted; genae oblique and only slightly convex, two-thirds as long as eyes, and practically glabrous though bearing a few vestigial hairs; neck very wide, with the anterior constriction sharply marked at the sides; palpi short though labial palpus is fairly slender; mental tooth broad, truncated at the tip; antennae fairly stout, reaching basal three-eighths of elytra, scape as long as and about 1.5 times as thick as segment 3, which is slightly shorter than segment 4, pedicel the shortest, five-sevenths as long as segment 3, segments 5–8 gradually decreasing in length towards apex, each about three times or a little less as long as wide, segments 8–10 equal in length to one another, terminal segment the longest, a little longer than scape though two-thirds as wide as the latter.

Pronotum relatively large, transverse subcordate, much wider than head, evidently wider than long, widest at about two-thirds from base, and more rapidly and strongly narrowed towards apex than towards base, with the basal part briefly subpedunculate; PW/HW 1.34, PW/PL 1.29, PW/PA ca. 1.57, PW/PB 1.37; sides rather widely reflexed before middle, narrowly so in basal third, strongly rounded in front, almost straightly convergent behind, and very briefly sinuate at about basal sixth at the sides of postangular denticles; apex slightly arcuate forwards, front angle on each side widely

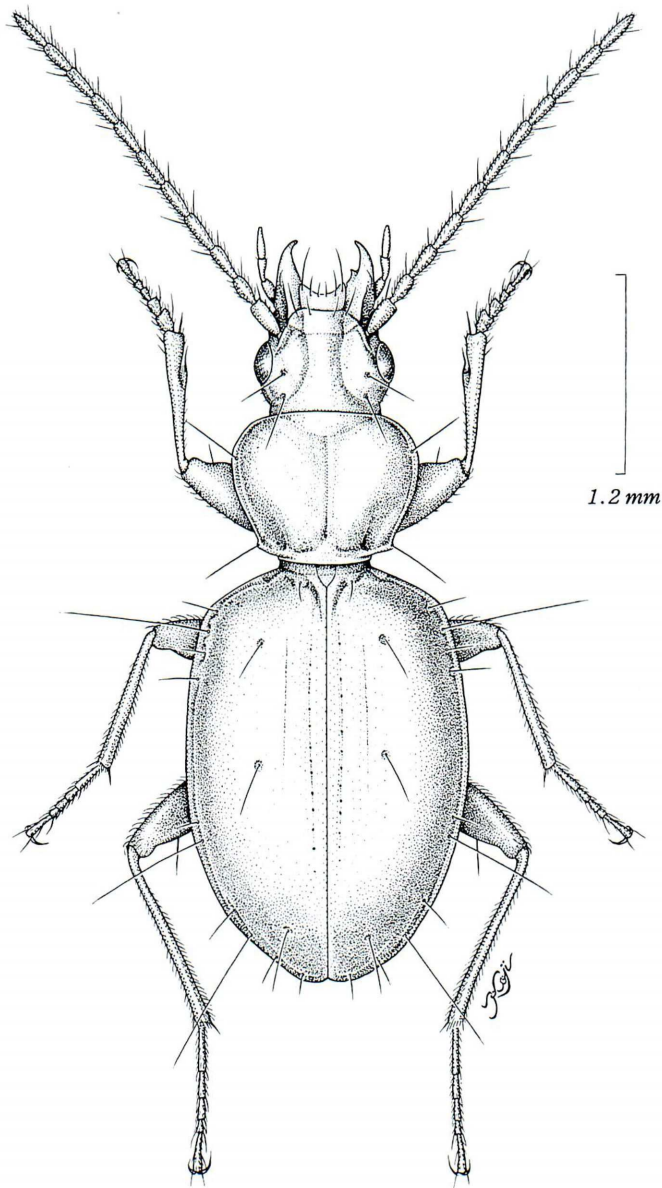


Fig. 1. *Dabatrechus eccentricus* S. UENO, sp. nov., ♂, from Mt. Guangwu Shan.

rounded off; base wider than apex, PA/PB ca. 0.87, gently oblique on each side inside hind angle, which forms an obtuse denticle slightly produced laterad; dorsum convex, with vague, irregularly transverse striations; median line shallow, reaching neither apex nor base; apical transverse impression mal-defined; basal transverse impression superficial and uneven, with a foveole on each side of median line; basal foveae small but

fairly deep; basal area above basal peduncle narrow and smooth.

Elytra ovate, wider than pronotum, widest slightly before the middle, with small basal parts and relatively pointed apices; EW/PW 1.52, EL/PL 2.78, EL/EW 1.41; shoulders widely rounded inclusive of arcuate prehumeral borders, which are rather widely bordered and complete to basal peduncle; sides widely bordered in anterior parts but narrowly so behind middle, feebly arcuate to near apices, which are narrowly rounded and relatively pointed, preapical emargination slight; dorsum convex though depressed on the disc before middle, steeply declivous at the sides though the apical declivity is rather gentle; only two inner striae present, stria 1 almost complete and coarsely punctate before middle, stria 2 shallower than 1, nearly smooth, and obsolete near base and in apical two-thirds; apical striole short though sharply impressed, hardly arcuate in anterior part; intervals flat even near suture, apical carina obtuse; two setiferous dorsal pores present on the site of stria 3 at about basal sixth and slightly before the middle; preapical pore present on apical declivity just behind the level of the terminus of apical striole and a little more distant from apex than from suture.

Ventral surface glabrous and smooth. Legs moderate in length, with thin tibiae and tarsi; protibiae straight, gently dilated towards apices, each with a vestigial groove on the external face and a few short hairs on the anterior face; tarsi short, tarsomere 1 longer than tarsomeres 2–3 combined but shorter than tarsomeres 2–4 combined in mesotarsus, as long as tarsomeres 2–4 combined in metatarsus; in ♂, protarsomeres 1 and 2 widely dilated and stoutly produced inwards at apices.

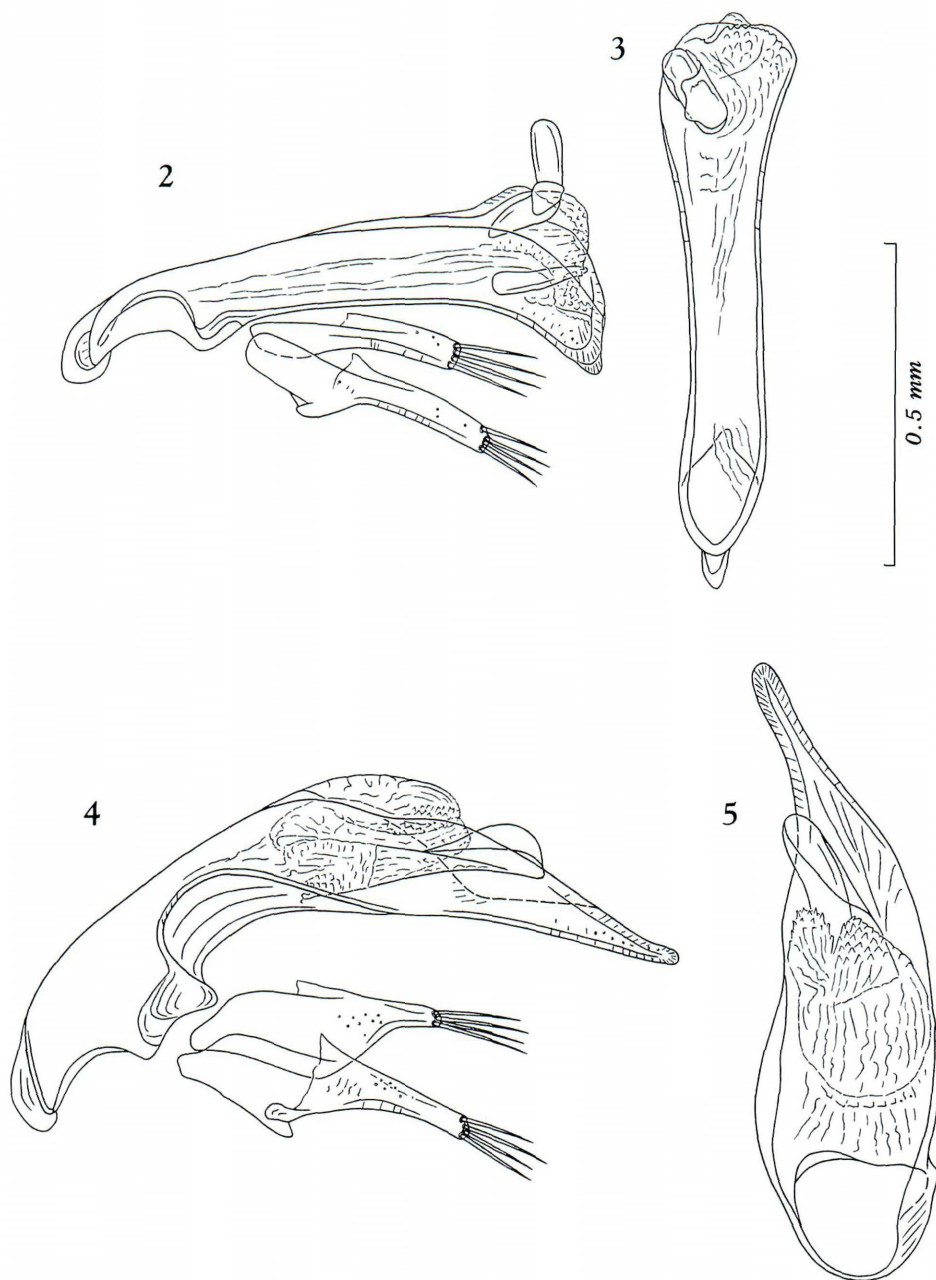
Male genital organ small though moderately sclerotized. Aedeagus one-third as long as elytra, elongate, hardly arcuate except at the apical part, nearly parallel-sided but rather widely dilated at the apical part, and widely membranous on dorsum; basal part not curved ventrad, being formed by two narrow lobes deeply emarginate at each ventral side and completely connected at the proximal extremity; sagittal aileron small but protrudent, hyaline except for the core; apical part dilated in both dorsal and right lateral views, curved ventrad, and abruptly ending in a very short apical lobe, which is directed to the left and rounded at the extremity in dorsal view, small and obtuse in left lateral view; left aedeagal wall not dilated at the apical part; ventral margin nearly straight at middle, moderately emarginate at the apical part. Inner sac minutely scaly at the apical part, bearing a pair of palp-like sclerotized copulatory pieces just inside apical orifice at the right dorsal and left ventral sides, each of which is imperfectly articulated at the middle and foldable. Styles slender.

Female unknown.

Type specimen. Holotype: ♂, 17–VI–2004, S. UENO leg. Deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Mt. Guangwu Shan, Zhaipo on the northeastern side, 1,780 m in altitude, in Nanjiang Xian of Sichuan, Southwest China.

Notes. The single known specimen of this extraordinary new species was taken at the side of a forestry road on the northeastern slope of Mt. Guangwu Shan, which lies at the southern side of the westernmost part of the Daba Shan Mountains in Nan-



Figs. 2-5. Male genitalia of *Dabatrechus* spp.; left lateral view (2, 4), and apical part of aedeagus, dorso-apical view (3, 5). — 2-3. *D. eccentricus* S. UENO, sp. nov., from Mt. Guangwu Shan (the left copulatory piece is folded). — 4-5. *D. hygrophilus* S. UENO, sp. nov., from the Yidao Xia in Baokang Xian.

jiang Xian of eastern Sichuan. The unpaved road is made through a broadleaved forest and has a shallow ditch at the mountain side, which is fed by trickles and either wet or keeping a very little, slowly moving water.

At the collecting site of the trechine beetle, the bottom of the ditch was thinly covered with stagnant water and scattered with fallen leaves. Two species of bembidiines were found here and there from beneath wet fallen leaves, and the trechine beetle was also found from beneath a fallen leaf half-immersed in the water. It was not particularly agile when exposed just like saproxylophilous members of the genus-group.

Since further searches did not yield any more specimens, we went back to that particular spot on the next day and spent many hours for seeking additional material, but all our efforts ended in vain.

Dabatrechus hygrophilus S. UÉNO, sp. nov.

(Figs. 4–6)

Length: 4.15 mm (from apical margin of clypeus to apices of elytra).

Closely similar in general appearance to *D. eccentricus*, but different from it in many details, above all in the shape of pronotum. Incredibly different from *D. eccentricus* in conformation of male genitalia, as will be described later.

Body constricted between prothorax and hind part, glabrous and polished on dorsum but partially pubescent on venter; microsculpture completely vanished. Colour very dark brown, shiny and not iridescent, head and prothorax almost black, elytra dark brown with reddish basal areas; clypeus and scape reddish; palpi and legs yellowish brown.

Head similar to that of *D. eccentricus*, but the eyes are larger and devoid of facets, the genae are less oblique, the frontal furrows are subangulate at middle, and the antennae are shorter; frontal furrows subangulate at middle, and more widely divergent in front and behind; supraorbital areas relatively flat, bearing two pair of supraorbital pores on lines slightly divergent posteriad; eyes hemispherically convex together with genae, but the facets are so degenerated except along peripheries, that the convex surfaces of eyes are smooth and shiny; genae convex at the anterior portions in continuation of the convexity of eyes, rapidly convergent behind towards neck constriction, and completely glabrous; neck constriction deeper than in *D. eccentricus*; mental tooth broad, rounded at the tip; antennae a little shorter than in *D. eccentricus*, reaching basal three-tenths of elytra.

Pronotum cordate, obviously narrower than in *D. eccentricus*, widest at about two-thirds from base, and more strongly contracted at base than at apex; PW/HW 1.23, PW/PL 1.11, PW/PA ca. 1.41, PW/PB 1.60; sides rather narrowly bordered throughout, strongly arcuate in front, less so behind, briefly but deeply sinuate at about basal two-thirteenths, and briefly parallel in basal area; apex slightly arcuate forwards, with front angles rounded off; base obviously narrower than apex, PA/PB ca. 1.14, almost straight at middle, and briefly and a little obliquely emarginate at each lateral end,

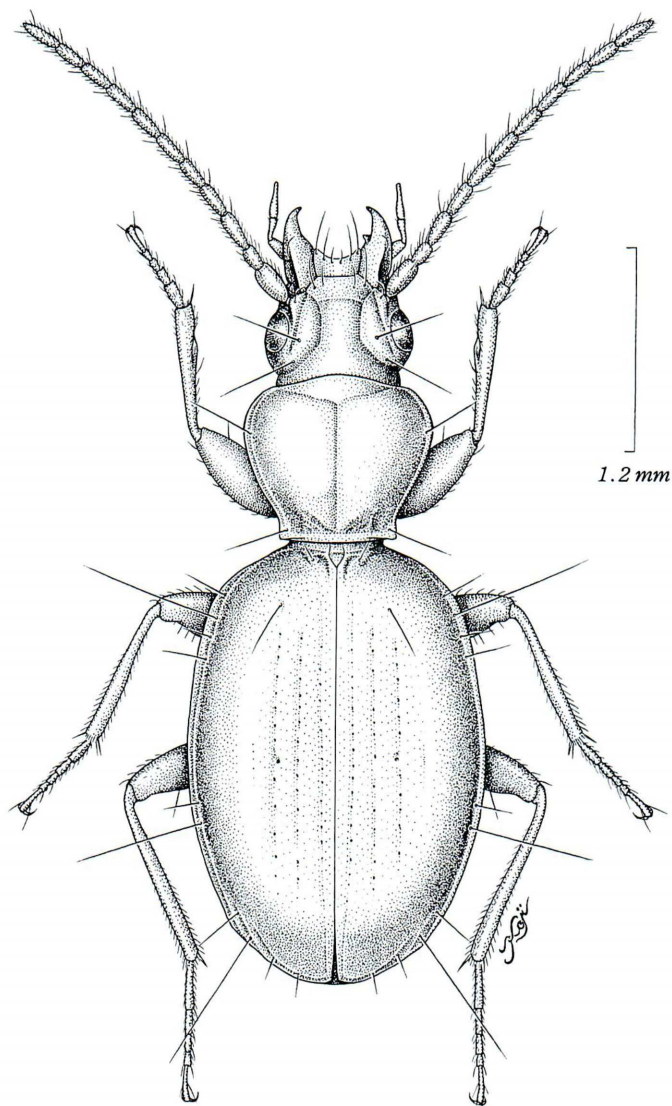


Fig. 6. *Dabatrechus hygrophilus* S. UENO, sp. nov., ♂, from the Yidao Xia in Baokang Xian.

basal peduncle extremely short and hardly recognizable; hind angles nearly rectangular though blunt at the corners; dorsum strongly convex and smooth, steeply declivous in marginal areas; median line fine except near basal transverse impression, which is continuous, somewhat sulciform and smooth, laterally merging into very small basal foveae; basal area very narrow, forming a collar.

Elytra suboval rather than ovate, evidently wider than pronotum, widest slightly before the middle, and almost equally narrowed towards bases and towards apices;

EW/PW 1.63, EL/PL 2.60, EL/EW 1.44; shoulders rounded, less salient than in *D. eccentricus*; prehumeral borders obviously more oblique than in *D. eccentricus* and only very slightly arcuate, with very narrow marginal gutter, which diminishes anteriorly and reaches the site of the base of stria 5; sides rather widely reflexed at the humeral part but very narrowly so in apical two-thirds, gently arcuate for the most part, and widely and conjointly rounded at apices, each without appreciable preapical emargination; dorsum strongly convex though somewhat depressed at the anterior part of the disc, very steeply declivous at the sides but rather gently so at the apical part; three inner striae distinctly impressed on the disc, all coarsely crenulate, stria 1 almost entire, 2–3 obsolete in both basal and apical areas; apical striole short though sharply impressed; intervals slightly convex near suture, apical carina obtuse; stria 3 with a single setiferous dorsal pore at two-fifteenths from base; in the holotype, vestige of a second pore perceptible on stria 3 at four-ninths from base, though not setiferous; preapical pore absent.

Ventral surface mostly glabrous and smooth, but each sternite bears several hairs at the median part. Legs as in *D. eccentricus*, but the protibiae are devoid of vestigial groove on the external face, and the two proximal protarsomeres in ♂ are only weakly dilated and minutely denticulate inwards at the apices; protarsomere 1 in ♂ elongate, 1.5 times as long as wide, protarsomere 2 about three-fourths as long as 1, also elongate in the same proportion as the latter.

Male genital organ strikingly different from that of *D. eccentricus*, a little larger and a little more heavily sclerotized. Aedeagus two-fifths as long as elytra, twisted to the right, lightly arcuate as a whole, widely concave at the left side before middle, and thoroughly membraneous on dorsum, with the right wall obviously lowered at the base of apical lobe; basal part straightly extended, open on both dorsal and ventral sides but the lateral walls are much higher than in *D. eccentricus*; basal orifice deeply emarginate at the sides; sagittal aileron elongate, wholly hyaline; apical lobe elongate, protruding right apically, and narrowly rounded at the tip in dorsal view, gradually tapered towards blunt extremity and somewhat reflexed at the terminal portion in lateral view; ventral margin nearly straight at middle in profile. Inner sac rather coarsely scaly at the apical part, bearing a large hyaline copulatory piece, which is about two-sevenths as long as aedeagus, spoon-like, right dorsally concave in apical half, and obliquely lying just inside apical orifice. Styles fairly wide in basal halves and with short narrow apical parts, left style obviously longer than the right and bearing short ventral apophysis, each provided with four, rather short apical setae.

Female unknown.

Type specimen. Holotype: ♂, 11–VI–2004, M. SATÔ leg. Deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Yidao Xia, 580 m in altitude, at Houping Cun of Houping Zhen in Baokang Xian, western Hubei, West-central China.

Notes. In ordinary trechine taxonomy, this new species could be regarded as belonging to a genus different from *Dabatrechus*, mainly in view of the marked differ-

ence in the pronotal configuration, elytral chaetotaxy and conformation of the male genitalia. However, it shares many other character states with *D. eccentricus*, and is discriminated at first sight from other genera of the *Agonotrechus* series. Even the male genitalia of the present species show the same trend of modification of the aedeagus, above all of its basal part, as that of *D. eccentricus*, though the apical lobe is considerably developed in this species in contrast with the extremely reduced one in the latter species. In all probability, these species are congeneric and the genitalic divergence between them may be a result of exceptional differentiation sometimes found among Chinese trechines.

The single known specimen of the present species was found walking on a wet vertical rock covered with humid mosses on the left side of the Yidao Xia, one of the five valleys of the Wudao Xia Nature Reserve, in a hilly area at the easternmost part of the Daba Shan Mountains. The moss-covered rock was at the bottom of the valley with its base about 2 m removed from the edge of the stream but nearly on the same level as the stream water. Peeling off the moss-mat, SATÔ found several bembidiines and the trechine walking on the bare rock about 20 cm above the bottom. Then we made every effort to find out some additional specimens but failed in finding any.

要 約

上野俊一：中国西部，大巴山脈に固有の好湿性チビゴミムシ類。—— 中国の西部，四川省と陝西省の省境を東西に走り，東端部が湖北省の西部に達する大巴山脈から，好湿性チビゴミムシ類の1新属2新種を記載し，これらに *Dabatrechus eccentricus* S. UENO および *D. hygrophilus* S. UENO という新名を与えた。新属 *Dabatrechus* は，云南省の北西部から知られる *Deuveotrechus* 属に似ている点が多いが，大顎，下唇，剛毛式などの特徴に決定的な相違があり，分布域も大きく離れているので，大巴山脈に固有の別属だと考えられる。既知の2種は，山脈の西端部に位置する光霧山と，東端部に位置する保康県の一箇峡とで濡れた落ち葉やコケの下から発見されたが，一見たがいによく似ているにもかかわらず，細かい形態的特徴にはかなり大きい差異があり，とくに雄交尾器の構造には，別属のものを思わせるほど顕著な相違がある。同ような現象は *Deuveotrechus* にもみられるので，中国産の古い型のチビゴミムシ類に特有の発現様式だろうと思われるが，世界的な観点からすれば異常で，分類上の異端者だといえるだろう。

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